

CLAIMS

1. A method for producing a polymer composition containing a filler comprising simultaneously spraying and drying a liquid containing a polymer component and a 5 liquid containing a filler under an atmosphere of a shock wave generated from pulse combustion.

2. A method for producing a polymer composition as claimed in claim 1, further comprising mixing the filler or filler-containing liquid with the liquid containing 10 said polymer component, before spraying, and then spraying it under an atmosphere of a shock wave generated from pulse combustion.

3. A method for producing a polymer composition as claimed in claim 1 or 2, wherein the filler is at least 15 one filler selected from the group consisting of carbon black, silica, water-glass, colloidal silica, clay and calcium carbonate.

4. A method for producing a polymer composition as claimed in any one of claims 1 to 3, wherein the liquid containing a polymer component is a liquid containing a 20 rubber latex.

5. A method for producing a polymer composition as claimed in any one of claims 1 to 4, wherein the polymer composition mixture before drying has a viscosity at 25°C 25 of 3000 mPa·s or less.

6. A method for producing a polymer composition as claimed in any one of claims 1 to 5, wherein a frequency of the pulse combustion is 50 to 1200 Hz and a temperature of a drying chamber of the atmosphere of the 30 shock wave generated from pulse combustion for spraying the liquid containing a polymer composition is 140°C or less.

7. A polymer composition produced by the method according to any one of claims 1 to 6.

35 8. A method for producing a natural rubber/carbon black master batch comprising mixing, into a natural rubber latex, an aqueous slurry of carbon black

containing 1 to 200 parts by weight of carbon black, based upon 100 parts by weight, in terms of a solid, of the rubber and 1 to 30 wt% of a surfactant based upon the weight of the carbon black (solid content), then spraying and drying the mixture thus obtained under an atmosphere of a shock wave generated from pulse combustion.

9. A method for producing a master batch as claimed in claim 8, wherein the surfactant is mixed, in advance with at least one of natural rubber latex and aqueous slurry of carbon black, followed by agitating and mixing the natural rubber latex and the carbon black slurry.

10. A method for producing a master batch as claimed in claim 8 or 9, wherein the surfactant is a nonionic surfactant or cationic surfactant.

11. A method as claimed in claim 10, wherein a viscosity at 25°C of the mixture before drying is 3000 mPa·s or less.

12. A method for producing a master batch as claimed in any one of claims 8 to 11, wherein a frequency of the pulse combustion is 50 to 1200 Hz and a temperature of a drying chamber under the atmosphere of the shock wave generated from pulse combustion for spraying the latex is 140°C or less.

13. A method for producing a master batch as claimed in any one of claims 8 to 12, wherein the mixture further contains at least one compounding agent selected from the group consisting of vulcanizing agents, vulcanization accelerators, antioxidants, metal oxides, fatty acids, resins and oils.

14. A master batch produced by a method according to any one of claims 8 to 13.

15. A method for producing a natural rubber/carbon black master batch comprising mixing, into a natural rubber latex, an aqueous slurry of carbon black and a water-soluble polymer, then spraying and drying the mixture thus obtained under an atmosphere of a shock wave

generated from pulse combustion.

16. A method for producing a master batch as claimed in claim 15, further comprising mixing, into at least one natural rubber latex and the aqueous slurry of carbon black, the water-soluble polymer, and then 5 agitating and mixing the latex and carbon black slurry.

17. A method for producing a master batch as claimed in claim 15 or 16, wherein the water-soluble polymer is polyvinyl alcohol (PVA), a water-soluble 10 cellulose derivative or a salt thereof.

18. A method for producing a master batch as claimed in claim 17, wherein an etherification degree of the water-soluble cellulose derivative is 0.5 to 1.6.

19. A method for producing a master batch as 15 claimed in claim 17 or 18, wherein a viscosity at 25°C of the mixture is 3000 mP·s or less.

20. A method for producing a master batch as claimed in any one of claims 15 to 19, wherein a frequency of the pulse combustion is 50 to 1200 Hz and a temperature of a drying chamber for spraying the latex is 20 140°C or less.

21. A method for producing a master batch as 25 claimed in any one of claims 15 to 20, wherein the mixture further contain at least one compounding agent selected from the group consisting of vulcanizing agents, vulcanization accelerators, antioxidants, metal oxides, fatty acids, resins and oils.

22. A master batch produced by a method according to any one of claims 15 to 21.

30 23. A method for producing a natural rubber/carbon black master batch by mixing a natural rubber latex and an aqueous slurry of carbon black, followed by drying, comprising separately feeding the natural rubber latex and the carbon black slurry from at least two starting 35 material feed lines, which is combined into a single line, and then spraying and drying the mixture under an atmosphere of a shock wave generated from pulse

combustion.

24. A method for producing a master batch as claimed in claim 23, wherein a time after combining the starting material feed lines to a single line, then 5 spraying the mixture under an atmosphere of a shock wave generated from pulse combustion is 0.1 to 10 seconds.

25. A method for producing a master batch as claimed in claim 23 or 24, wherein viscosities at 25°C of the natural rubber latex and the aqueous slurry of carbon 10 black are 3000 mP·s or less, respectively.

26. A method for producing a master batch as claimed in any one of claims 23 to 25, wherein a frequency of the pulse combustion is 50 to 1200 Hz and a temperature of a drying chamber for spraying the latex is 15 140°C or less.

27. A master batch produced by a method according to any one of claims 23 to 26.

28. An apparatus for mixing and drying at least two starting liquid or dispersion of solid substances, comprising pumps for feeding at least two starting 20 liquids, a control mechanism for controlling a feed ratio of the pumps, at least two starting liquid feed lines for feeding at least two starting liquids at any ratio, and a pulse combustion apparatus for spraying, after combining 25 the at least two starting liquid feed lines into the single feed line, the combined liquids and drying the mixture under an atmosphere of a shock wave generated from pulse combustion.

29. A drying apparatus as claimed in claim 28, 30 wherein said at least two starting liquids are a natural rubber latex and an aqueous slurry of carbon black.